SUMMARY OF ILLNESSES AND INJURIES DUE TO OCCUPATIONAL EXPOSURE TO PESTICIDES OF GROUND APPLICATORS REPORTED BY PHYSICIANS IN CALIFORNIA IN 1984

By

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SUMMARY

There were 161 cases of occupational illness and injury due to exposure to pesticides reported for ground applicators in 1984. This group of workers includes those who apply dusts or sprays by application equipment mounted on vehicles operating on the ground, plus those individuals who perform tasks associated with these applications. Of the 161 cases reported, there were 72 systemic illnesses, 36 eye injuries, 49 skin injuries, and 4 eye and skin injuries. When these same 161 incidents were examined for their pesticide exposure/illness relationship, 21 were found to be "Unlikely", 40 were judged "Possible", 53 were found to be "Probable", and 47 were "Definite". There were 17 fewer cases reported for this work category this year than were reported in 1983.

The pesticides containing glyphosate, methomyl, propargite, paraquat and parathion were associated with 45% of illnesses and injuries where the identity of an individual pesticide was reported. Parathion and methomyl were responsible for the greatest number of systemic illnesses. Propargite and glyphosate were again responsible for the most eye and the most skin injuries. Propargite was the pesticide most often reported to cause any kind of illness or injury to ground applicators. Exposures in this work category alone resulted in 11 estimated days of hospitalization and 253 estimated days of disability. Hospitalization was down from 15 days in 1983 and the total of days of disability was down from 280.

INTRODUCTION

Under Section 2950 of the California Health and Safety Code, each injury or illness that occurs in the State and may potentially be pesticide-related is required to be reported by the attending physician to the local County Health Department within 24 hours. In turn, county health officials must report the incident to the local County Agricultural Commissioner, the State Department of Food and Agriculture, and the State Department of Health Services. The incident is then investigated by the local County Agricultural Commissioner's staff and the resulting report is submitted to the California Department of Food and Agriculture's (CDFA) Worker Health and Safety Unit for evaluation and classification.

Based on input from State and County agencies, physicians, and available toxicological and medical data, the Worker Health and Safety Unit evaluates each pesticide-related incident and places it within a system of classification based on work activity and illness type. Each incident is classified according to the circumstances of exposure and the reported signs and symptoms of disease. Classifications used are "Definite", "Probable", "Possible", and "Unlikely".

The accompanying discussion is followed by tables reporting illness types and their pesticide relationship (Table 1), causal pesticides (Table 2), and agricultural commodities associated with pesticide illnesses for ground applicators (Table 3). Table 4 presents county of occurrence for 1984 pesticide illnesses and injuries. Table 5 is a tabulation of estimated days of hospitalization and disability. Information on general pesticide illness statistics for 1984 can be found in HS-1304. Other work activity categories are related in their respective "HS" reports.

DISCUSSION

In the calendar year 1984, there were 2,461 incidents reported by physicians as potentially pesticide-related illnesses or injuries. Of these, 1,156 had adequate information and were judged to have some degree of likelihood to be both occupationaly and pesticide-related. The remainder had inadequate information, were nonoccupational exposures, or were determined, after investigation, not to be related to pesticide exposure.

One hundred-sixty-one of these 1,156 incidents reported by California physicians as potentially pesticide-related were assigned to the "Ground Applicator" classification. Incidents assigned to this work activity classification are those affecting individuals who apply pesticides to agricultural fields or other sites using vehicle-borne application equipment. Seventy-two of the 161 reported illnesses and injuries were systemic illnesses, which are generally considered more serious than topical injuries. The remainder were classified as topical injuries with 36 affecting the eye, 49 affecting the skin, and 4 affecting both eye and skin. There were no pesticide-related deaths of ground applicators reported in California in 1984.

When examining these same 161 illnesses and injuries for their relationship to pesticides, 21 were found to have an "Unlikely", 40 were determined to have a "Possible", 53 were judged to have a "Probable", and 47 were

determined to have a "Definite" exposure/symptom relationship.

Twenty-one episodes of ground applicator illness or injury occurring in 1984 were judged to have an "Unlikely" relationship to pesticide exposure due to an absence of confirmatory evidence required to place the incident in a more positive category. Similarly, there was no conclusive evidence that ruled out a pesticide relationship. This year, three cases were eye injuries, five were skin injuries and 13 were systemic illnesses.

One example of the type of incident that results in an "Unlikely" pesticide-illness classification involved an applicator who was using parathion to treat almonds in early February and was subsequently treated for eye irritation. The applicator did not recall any specific exposure during treatment, and he did not show signs of injury until a week later. In addition, the applicator reportedly wore protective equipment which included goggles. In combination, these indicators cast doubt upon a firm pesticide relationship. Other illnesses and injuries in the "Unlikely" classification can be discounted for similar reasons.

In the remaining 140 cases reported in 1984 the relationship to pesticide exposure is more clear resulting in classification as "Possible", "Probable" or "Definite". Of these, four were eye/skin injuries, 33 were eye injuries, 44 were skin injuries and 59 were systemic illnesses.

Of the systemic illnesses that were reported this year, 13 were "Unlikely", 25 were "Possible", 21 were "Probable" and 13 were "Definite". Systemic cases comprised 45 per cent of all reported illnesses.

The most life-threatening systemic illness this year involved an applicator treating Brussels sprouts with a combination of Systox 2, Phosdrin 4-EC and Diazinon 50 W. Even though he wore protective equipment, he developed nausea with vomiting, a headache and tightness in his chest at the end of the workday. He was told by his supervisor to go to a local hospital where he was diagnosed as an organophosphate poisoning. As a result of this incident, he was hospitalized on two separate occasions and lost at least one month of work.

In a second serious incident, an applicator became ill at home after using Supracide to treat artichokes at work. This worker also was admitted to a hospital a second time by his medical supervisor; he had been released too early by the admitting physician. His medical supervisor sent him back to the emergency room with instructions for him to be readmitted to the hospital if blood samples revealed low cholinesterase levels. This individual lost at least seven days from work.

There were 49 injuries to the skin reported for ground applicators in 1984. Five were determined to be "Unlikely", 13 were "Possible", 17 were "Probable" and 14 were "Definite". A typical example of serious skin injury involved an applicator treating an almond orchard with propargite. After work, he developed a rash on his arms, back and legs even though he had worn coveralls. Fortunately, this inidividual did not miss time from work.

Another hazard ground applicators face is eye injury. In 1984 there were 36 cases of eye injury reported, three of which were "Unlikely", two were "Possible", 12 were "Probable" and 19 were "Definite". Eye injuries, like

skin injuries, are far easier to assign to the more positive categories since there are often physical signs of injury which is not always the case with systemic illness. In one 1984 incident, two men received eye injuries when a hose separated from an application rig. The two men were wearing safety glasses which do not protect the eyes as goggles would.

In some cases, both eye and skin injury are reported for the same individual. This occurred in four incidents this year (three "Probable" and one "Definite"). In the case that was definitely related to pesticides, an applicator received a rash on his face and painful eye irritation while treating grapes with propargite. However, no time was lost from work as a result of this incident.

CONCLUSIONS

Illnesses and injuries to ground applicators occur primarily at the time of the initial pesticide application so that the employment of better protective measures, including the provision of better information, education, and supervision, might reduce the number of cases seen each year. It is recognized that some of the most effective pesticides are also some of the most toxic to the humans that use them. Even so, the use of chemicals of lower toxicity to humans should be encouraged whenever feasible.

In addition, study of the reported incidents for 1984 reveals that several employers and employees need to give more attention to the use of proper protective clothing and equipment. Poorly-fitting respirators that allow pesticide vapors to bypass the filters, loose goggles, and improperly worn face-shields that allow splashed or sprayed material to reach the eyes, and improperly sized coveralls, gloves, and boots that allow skin injury at the wrist, the nape of the neck, and the lower leg all need attention. Perhaps the least expensive and quickest ways to prevent some ground applicator illnesses and injuries is to improve the training of workers regarding safe work practices and proper personal hygiene. Ultimately, each individual who works with pesticides must also take considerable responsiblity for himself or herself to comply with the safe-use information provided and available.

Table 1 - Types of Illnesses and Injuries Reported in 1984 for Ground Applicators Showing Pesticide-Illness Relationships.

Illness Type	Pesticide-Illness Relationship				
	Unlikely	Possible	Probable	Definite	Total
Systemic	13	25	21	13	72
Eye	3	2	12	19	36
Skin	5	13	17	14	49
Eye/Skin	0	0	3	1	4
Total	21	40	53	47	161

Table 2 - Primary Pesticides Responsible for Ground Applicator Illnesses and Injuries for 1984 According to Illness Type.

	Types of Illness				Total
	Systemic	Eye	Skin	Eye/Skin	Cases
ALACHLOR	0	0	1	0	1
ALDICARB	1	0	0	0	1
AMITROLE	0	1	0	0	1
AZINPHOSMETHYL	2	1	0	0	3
BENOMYL/ZIRAM	0	2	1	0	3
CARBARYL	2	0	0	0	2
CHLORDANE	0	1	0	0	1
CHLOROBENZILATE	1	0	0	0	1
CHLOROTHALONIL	0	0	1	0	1
CHLORPYRIFOS	2	1	0	0	3
CRYOLITE	0	0	2	0	2
CYCLOHEXIMIDE	0	1	0	0	1
CYHEXATIN	0	0	1	0	1
DIAZINON	4	0	0	0	4
DIENOCHLOR	1	0	0	0	1
DIMETHOATE	3	0	0	0	3
DIMETHOATE/NALED	2	0	0	0	2
DINITROPHENOL	1	0	1	0	2
DIPHENAMID	0	1	1	0	2
DISULFOTON	1	0	0	0	1
DSMA/MSMA	0	0	1	0	1
EPTAM	0	1	0	0	1
FLUAZIFOP-BUTYL	0	1	0	0	1
GIBBERELLINS	0	0	1	0	1
GLYPHOSATE	0	5	5	0	10
IPRODIONE	0	0	1	0	1
LINDANE	1	0	0	0	1
MALATHION	1	1	0	0	2
MANEB	0	0	1	0	1
METHIDATHION	1	0	1	0	2
METHOMYL	7	0	0	0	7
MONOCROTOPHOS	1	0	0	0	1
ORYZALIN	0	0	2	0	2
OXYFLUORFEN	1	0	0	0	1
PARAQUAT	3	1	3	1	8
PARATHION	9	1	0	0	10
PERMETHRIN	1	0	0	0	1
POTASSIUM OLEATE	1	0	0	0	1
PRONAMIDE	1	0	0	0	1
PROPARGITE	1	6	8	2	17
SIMAZINE	0	0	1	0	1
SODIUM ARSENITE	0	0	1	0	1
SULFUR	1	1	1	0	3
TRIADIMEFON	0	1	1	0	2
ZIRAM	0	1	0	0	1
MISC. COMBINATIONS	14	8	10	0	32
NOT DETERMINED	9	1	4	1	15
Total	72	36	49	4	161

Table 3 - Commodities and Application Sites Associated with Illnesses and Injuries of Ground Applicators in 1984

ALFALFA	4	LETTUCE	5
ALMONDS	23	OLIVES	2
APPLES	3	ORANGES	5
APRICOTS	4	ORNAMENTALS	5
ARTICHOKES	1	PEACHES	5
BROCCOLI	1	PEARS	2
BRUSSELS SPROUTS	1	PLUMS	1
CAULIFLOWER	1	PRUNES	2
CITRUS	3	STRAWBERRIES	3
CORN	2	TOMATOES	5
COTTON	8	WEEDS	8
DATES	1	NOT SPECIFIED	40
FRUIT TREES	1		
GRAPES	24	TOTAL	161
LEMONS	1		

Table 4 - County of Occurrence of Ground Applicator Illnesses and Injuries for 1984

ALAMEDA	1	RIVERSIDE	7
BUTTE	1	SACRAMENTO	3
COLUSA	2	SAN BENITO	1
CONTRA COSTA	1	SANTA CLARA	2
FRESNO	19	SAN DIEGO	6
IMPERIAL	4	SAN JOAQUIN	3
KERN	32	SANTA BARBARA	1
KINGS	1	SANTA CRUZ	1
LOS ANGELES	4	SOLANO	5
MADERA	4	SONOMA	1
MERCED	6	STANISLAUS	8
MONTEREY	15	SUTTER	6
NAPA	1	TULARE	16
NEVADA	1	YOLO	7
ORANGE	1	YUBA	1

Table 5 - Estimated Days of Hospitalization and Disability for Ground Applicators During the Years 1982, 1983 and 1984

	Hospitalization (Days)	Disability (Days)
1982	42	216
1983	15	280
1984	11	253